CHAPTER 1

Grasping

1.1 The Dawn of Understanding

In a justly famous scene from *2001: A Space Odyssey*, set to Richard Strauss's *Also Sprach Zarathustra*, a hominid ancestor, squatting among the skeletal remains of a tapir, reaches out and tentatively grasps a femur. It is telling that this is how Stanley Kubrick chose to dramatize the initial transformation, induced by an alien obelisk, of our hominid ancestors, that eventually gives rise to space-exploring humanity in the twenty-first century. Not only does our hominid ancestor grasp the femur, but they grasp, as well, an important application. Squatting among the skeletal remains, femur in hand, our hominid ancestor taps the bones in an exploratory manner. Each strike of the femur grows in force until finally, in a crescendo of activity, they smash the tapir's skull to pieces. Our hominid ancestor has reached a crucial insight, that an implement, such as the femur, might transform tapir into prey. Moreover, the application generalizes. The femur might also be used as a weapon against competing groups of hominids. The acquired technology thus has political consequences. What is presently important, however, is the connection between grasping and cognition. We say we have grasped a situation when we have understood it. And philosophers are prone to speak of thinkers grasping the thoughts they think. Kubrick dramatizes the connection between grasping and cognition by having our hominid ancestor's grasping the femur among the tapir's skeletal remains be the primal scene of a dawning understanding.

We have *grasped* a situation when we have understood it. We have a *grip* on it. If the understanding in question is practical, we might say that we have *matters in hand*. And we *touch upon* subjects for discussion. Nor are tactile metaphors confined to forms of higher cognition and their expression in rational discourse. They persist, as well, in our description of perceptual awareness. Not only do we speak of recognizing an object that we see as *grasping* the object present in our perceptual experience, but the

presentation in experience is itself a kind of grasping. In perceiving an object we *apprehend* it. In this way, perception puts us in *contact* with its object. The tactile metaphors for perceptual awareness tend, on the whole, to be modes of assimilation, and *ingestion* is a natural variant (see Johnston 2006b; Price 1932), as when we *drink in* the scene. Thus, for example, Peter John Olivi and Jacopo Zabarella use the Latin *imbibere*, to drink in, to describe perceptual apprehension. While drinking in is a species of gustation and so not, strictly speaking, a species of touch, it does, however, involve a tactile component. Relatedly, our hominid ancestor, looking up from the tapir's remains, *takes in* the scene before them. Indeed, this metaphor is inscribed into the history of the English language – "perception" derives from the Latin *perceptio*, meaning to *take in* or *assimilate* (Burnyeat 1979, 102). If in looking up from the tapir's remains, they see the obelisk, then, in a manner of speaking common among contemporary philosophers, the obelisk is the *content* of our hominid ancestor's perception. But if the obelisk is the content of their perception, then their perception of it is its *container*. To bring something into view so that it figures in the content of perception would be to contain it within that perception. But containment itself is a mode of assimilation.

Even granting the primordial and persistent use of tactile metaphors for perception and cognition more generally, one may wonder whether grasping is really at the center of the semantic field of metaphors for sensory presentation. Grasping may involve contact, but not all contact involves grasping, not even all perceptual modes of contact. Some elements of the semantic field, such as talk of "contact," are logically independent of grasping. And this can raise the following worry. Perhaps for something to be present in sensory experience is for the perceiver to be in perceptual contact with it. If so, perhaps it is contact, and not grasping, that is the central metaphor for sensory presentation. Grasping, on this interpretation, is something further than the object of perception being presented in the perceiver's experience. Perhaps to grasp what we are in perceptual contact with is to recognize what perception presents us with.

The logical observation that occasioned this worry does not force upon us the alternative reading where contact is sensory presentation and grasping recognition (though, as we have observed, the metaphor of grasping can have such uses). That there can be perceptual contact without grasping is consistent with contact being an important component of grasping that is at the center of the semantic field. Thus, for example, Broad (1952) uses both "contact" and "prehension" for sensory presentation presumably because prehending the object of perception involves being in contact with

it. Talk of contact captures the visceral immediacy of sensory presentation, its force and vivacity. Moreover, talk of contact emphasizes the existence of an external limit determined by that with which we are in contact, the experience of which, as we shall see, plays an important role in sensory presentation. Talk of grasping, on the other hand, captures other important aspects of perceptual presentation, specifically, that it is apt to think of perception as a mode of assimilation. Moreover, it will emerge that the objectivity of perception is best understood in terms of perception formally assimilating to its object in the sense that it does. In this way, the full justification for the claim that grasping is at the center of a semantic field of metaphors for sensory presentation consists in the fruits that it will bear. However, that is not all that can be said. The hypothesis that grasping is at the center of the semantic field can explain why contact is included, but the alternative hypothesis that contact is at the center of the semantic field could not explain why so many of the other metaphors are modes of assimilation.

What makes tactile metaphors for perception apt? Tactile metaphors for perceptual awareness, even for non-tactile modes of awareness such as vision and audition, are primordial and persistent. Most contemporary philosophers of perception apply them unselfconsciously, indeed, unconsciously. That they do is a testament to the power of such metaphors. Understanding the power they have over us, understanding what makes them so compelling, we may gain insight into the object of these metaphors. In understanding what makes grasping an apt metaphor for perception generally, if it is indeed one, we may gain insight into the nature of sensory presentation. Or so I suggest.

We shall begin with a phenomenological investigation into the nature of grasping, a form of haptic touch. The investigation is phenomenological in that it seeks to uncover how grasping, understood as a mode of haptic perception, presents itself from within tactile experience. It is phenomenological because the object of investigation is restricted to perceptual appearances and not because of any methodology deployed in pursuing that investigation. The investigation thus need not involve "bracketing," nor need it confine itself to the deliverances of introspection in determining the nature of haptic appearance (for discussion of the reliability of introspection, see Bayne and Spener 2010; Schwitzgebel 2008). In trying to understand how grasping, understood as a mode of haptic perception, presents itself from within tactile experience, we may avail ourselves of empirical and historical resources. Once we have a better understanding of how grasping presents itself from within tactile experience, we will be in a

better position to understand why grasping also presents itself as an exemplar of sensory presentation more generally.

We may avail ourselves of empirical resources since phenomenology is something about which discoveries can be made. As Hilbert (2005) and Phillips (2012) argue, psychophysics can contribute to our understanding of perceptual phenomenology. Similarly, we might reasonably expect empirical research to reveal important aspects of the phenomenology of haptic perception. Indeed, as Fulkerson (2014) argues at length, there is much to learn about the phenomenology of haptic perception from its empirical study.

In investigating the phenomenology of haptic perception, not only may we avail ourselves of empirical resources, but we may also avail ourselves of historical resources. If I am right that our unselfconscious, indeed, unconscious, use of tactile metaphors for perception is best explained by their persistent aptness, then looking at early historical examples of these metaphors, when they were more vivid and strongly felt, promises to shed light on those aspects of the phenomenology of haptic experience that make them apt.

Grasping may be an apt metaphor for perception generally, and to that extent at least, an exemplar of sensory presentation, but it does not follow that all perception is a form of touch. One may grant that tactile metaphors for perceptual awareness are in some sense apt while eschewing any such reductive explanatory ambition. Such ambitions were rife in Greek antiquity. Thus Lindberg (1977, 39) observes that in the ancient world, "the analogy of perception by contact in the sense of touch seemed to establish to nearly everybody's satisfaction that contact was tantamount to sensation, and it was not apparent that further explanation was required." Aristotle criticizes this reductive explanatory strategy. Conceiving of non-tactile modes of perceptual awareness on the model of touch will only seem explanatory insofar as touch is antecedently understood to be an unproblematic mode of perception. However, Aristotle's belaboring and not always completely resolving the *aporiai* concerning touch in *De anima* 2 11 undermines that assumption (Derrida 2005; Kalderon 2015). And if further explanation is required, then we can no longer simply assume that contact is tantamount to sensation. Nevertheless, Aristotle accepts the aptness of the metaphor. Perception, for Aristotle, remains a mode of assimilation. Aristotle defines perception as the assimilation of sensible form without the matter of the perceived particular (*De anima* 2 12 424 a 18–23, 2 5 418 a 3–6). So acceptance of the aptness of the metaphor carries with it no commitment to any such reductive explanatory ambition. Grasping

may be an apt metaphor for perception, even for non-tactile modes of perceptual awareness, such as vision and audition, without perception being reduced to a form of touch. Indeed, if perception is reduced to touch, then what strikes us as tactile metaphors for perception generally would, in truth, be no metaphors at all.

1.2 Haptic Perception

Grasping is a form of haptic touch. Haptic touch involves active exploration of the tangible object. This can involve a range of different stereotypical exploratory activities often combined in sequence. The different stereotypical exploratory activities are suited to presenting different ranges of tangible qualities. Thus to discern the texture of an object the perceiver may deploy lateral movement across its surface. Holding a stone in their hand, our hominid ancestor may feel the roughness of the stone by rubbing their thumb across its surface. And its hardness may be felt by applying pressure to it. According to the taxonomy of Lederman and Klatzky (1987), grasping is a distinctive exploratory activity that they describe as "enclosure." Grasping an object allows the perceiver to discern a different range of tangible qualities. If texture is perceived by lateral motion and hardness by applying pressure, grasping or enclosure makes volume and global shape available in tactile experience. Other stereotypical exploratory activities include: "static contact" – passively resting one's hand on an externally supported object, without an effort to mold to its contours, to determine its temperature; "unsupported holding" – holding the object without external support, and without molding, to determine the object's heft or weight often involving a "weighing" motion; "contour following" – a smooth, non-repetitive tracing of the contours of the object; "part motion test" – moving a part of the object independently of the whole; and "specific function test" – moving the object in such a way as to perform various functions. Though these stereotypical exploratory activities are optimized for determining a specific range of tangible qualities, they can also determine other tangible qualities, though perhaps less well, with less tactual acuity. Thus while grasping or enclosure may present the overall shape of the object, to determine its exact shape the perceiver must use contour following. Grasping, however, like contour following, is relatively general in the range of tangible qualities it can present. Thus, grasping is itself a way of applying pressure to an object and, hence, a way of perceiving its hardness, as well as other of the object's tangible qualities such as temperature, moistness, vibration, a metallic feel, and so on. Not only are

these stereotypical exploratory activities optimized to determine a specific range of tangible qualities that vary in generality, but they can also be chained together to provide the perceiver with a more complete profile of the corporeal aspects of the object under investigation.

With enclosure, Lederman and Klatzky write:

> the hand maintains simultaneous contact with as much of the envelope of the object as possible. Often one can see an effort to mold the hand more precisely to object contours. Periods of static enclosure may alternate with shifts of the object in the hand(s). (1987, 346–7)

The quoted passage brings out several important features of grasping, understood as a mode of haptic perception.

First, grasping a rigid, solid body involves the hand's maintaining simultaneous contact with as much of its overall surface as possible. Grasping is thus a kind of incorporation. Recall that what unites the various tactile metaphors for perception, even for non-tactile modes of perceptual awareness such as vision and audition, is that they tend to be modes of assimilation, and grasping exemplifies this pattern. It may not be as complete an incorporation as the variant, ingestion, but it remains a clear mode of assimilation nonetheless. In maintaining simultaneous contact with as much of its overall surface as possible, the hand assimilates to the contours of the object. As we shall see, that the grasping hand assimilates to the object grasped is a manifestation of the objectivity of that haptic perception. This is part of what makes it an apt metaphor for perceptual presentation more generally.

Second, not only does the grasping hand assimilate to the overall shape and volume of the object grasped, but, as Lederman and Klatzky (1987) observe, effort is typically exerted to mold the hand more precisely to the object's contours. So grasping or enclosure involves not only the hand's configuration in maintaining simultaneous contact with the overall surface of the object, but the force of the hand's activity as well. Not only is this force exerted in achieving the end of molding the hand more perfectly to contours of the object grasped (on the preparatory reach involved in grasping see Jones and Lederman 2006, chapter 6), but it is exerted as well in the end's achievement – maintaining simultaneous contact with the overall surface of the object requires continued effort to sustain. This is physiologically and phenomenologically significant. It is physiologically significant in that the activation of different sets of receptors is coordinated in haptic perception (see Fulkerson 2014, chapter 3, and Hatwell et al. 2003, chapter 1, for discussion). Grasping or enclosure will involve not

only cutaneous activation, but also the distinct sets of activations involved in kinesthesis, motor control, and our sense of agency. Moreover, this is reflected in our phenomenology. We feel the force with which we grip the object as well as the object's overall shape and volume.

Third, there is a tendency, in grasping or enclosure, to shift the object periodically in one's hands. What explains this? Begin with Lederman and Klatzky's (1987) observation that there is a tendency for perceivers to exert effort to mold their hand more precisely to the contours of the object grasped. In grasping an object, the grasping hand in this way assimilates to the overall shape and volume of the object grasped. Consider grasping a rigid, solid body, such as a stone. In grasping a stone, our hominid ancestor extends their hand's activity; they tighten their grasp, until they can no more. Since the stone is solid, it resists penetration. Since it is rigid, it maintains its overall shape and volume even when in the hominid's grasp. Contrast the way the overall shape and volume of an elastic body, such as a sponge, deforms as it is squeezed. With the stone in its grip, the hand of our hominid ancestor assimilates to the overall shape and volume of the stone. Of course, hands are unevenly shaped and imperfectly elastic. This means that an effort to mold one's hand to a rigid, solid body thus disclosing its overall shape and volume will most likely be imperfectly realized. There may be some areas of the object's surface that the grasping hand does not conform to. Haptic perception is thus partial in something like Hilbert's (1987) sense. Perception is partial if the object of perception is not wholly present in the awareness of it afforded by perceptual experience. There may be more to the object of perception, even in its sensible aspects, than is determined in any given perception. The tendency to shift the grasped object in our hands compensates for this partial and imperfect disclosure. In shifting the object in one's hand, an area that the hand did not previously conform to may become accessible to touch. Successive grips and the manner in which the object moves in one's hands as one shifts between them may provide a better overall sense of the shape and volume of the rigid, solid body.

I have offered an explanation of the tendency, observed by Lederman and Klatzky (1987), for the perceiver to shift the object of haptic exploration periodically in their hands in terms of the partiality of haptic perception. That explanation is incomplete. Active exploration of the object of haptic investigation could only be motivated to compensate for its partial and imperfect disclosure if the perceiver has the sense, perhaps instinctive, that there is more to the corporeal nature of the object than is disclosed in their grasp. This is the allure of the tangible – the sense, or

premonition, that, at any given moment, the body exceeds what is disclosed to us by touch. Our tactile sense of a body's "thingness" – its concrete particularity – consists, in part, in this allure. (Compare Harman's 2005, 141–4, discussion of allure; though, for Harman, allure carries with it, not only the suggestion of hidden depths, but inaccessibility as well.) Without this primitive sense that there are further tangible aspects of the body as of yet unfelt, the partiality of haptic perception, by itself, could not explain the tendency for perceivers to shift the object of haptic investigation periodically in their hands. The partial and imperfect character of haptic disclosure must itself be disclosed in the haptic experience that affords it.

The explanation is incomplete in another way. In periodically shifting the object in their hands to compensate for the partial and imperfect disclosure of the object grasped, the perceiver's haptic experience must exhibit perceptual constancy as well (on the importance of constancy phenomena to understanding perception, see Burge 2010; Smith 2002).

Very often, objects in the scene before us are somehow perceived to be constant or uniform or unchanging in color, shape, size, or position, even while their appearance with respect to these features somehow changes. This is a familiar and pervasive fact about perception, even if it is notoriously difficult to describe accurately let alone adequately account for. Perceptual constancy is not confined to vision. Importantly, it is exhibited in haptic perception as well. Thus, for example, our haptic experience of roughness exhibits perceptual constancy (Yoshioka et al. 2011). The texture of a stone picked up by our hominid ancestor will feel rough, and just as rough when felt with a quick motion as when felt with a slow motion, even though feeling the stone's rough texture with a quick motion does not feel the same as feeling it with a slow motion. Other forms of haptic perception exhibit perceptual constancy as well.

Grasping or enclosure, understood as a mode of haptic perception, itself exhibits perceptual constancy. Thus, the perceiver feels the constant overall shape and volume of the object even though it feels different in successive grips. What the perceiver feels in moving the object between successive grips changes throughout this process, but the object disclosed by this haptic exploration is not Protean in character. If the object were changing its overall shape and volume in the process of the perceiver's handling it, then shifting the object could be no compensation for the partial and imperfect disclosure of the object grasped. If the object were Protean, and the perceiver shifted it in their hands, then its overall shape and volume would change, and the opportunity to feel what was unfelt would be forever lost.

In grasping, understood as a mode of haptic perception, the perceiver attends only to the constant tangible qualities it presents; in the case of a rigid, solid body, the perceiver attends to its constant overall shape and volume, as well as other constant tangible qualities that grasping may disclose. Though there may be a felt difference in changing patterns of intensive sensation in handling the object (changing patterns of pressure and thermal sensation, say), haptic experience presents the constant overall shape and volume of the object. Of course, different aspects of the overall shape and volume may be present at different times, given the different ways the body is being handled. Sensory presentation being partial, the perceiver may now feel this corner and now that. But these presented aspects of the overall shape of a rigid, solid body are experienced as stable aspects of a body that retains its shape, despite the perceiver's handling, because of the self-maintaining forces at work in its constitution. So the tendency, observed by Lederman and Klatzky (1987), for the perceiver to periodically shift the object in their hands is not only explained by the partiality of haptic perception, but could only be so explained if the haptic experience this behavior gives rise to exhibits perceptual constancy. (Compare Matthen's 2015 discussion of the construction of isotropic perceptual models in active perception.)

Allow me to make two further observations about this passage, though now about issues that are merely implicit.

First, grasping is an activity and so is spread over time. It has duration. Not only does our hominid ancestor tentatively reach out and grasp the tapir's femur from among its skeletal remains – an event with duration – but its grasp must be actively maintained over a period of time. Maintaining simultaneous contact with the overall surface of a rigid body, or some non-insignificant portion of it, is a state sustained by activity. In this regard, it is like Ryle's (1949, 149) example of keeping the enemy at bay, or Kripke's (1972/1980) example of the connection between heat and molecular motion. The state thus obtains for the duration of the sustaining activity. Moreover, in coming to perceive its overall shape and volume, the perceiver may shift the object in their hand. The tactile sense of an object's overall shape or volume is disclosed by such activity. And since activity has duration, it is disclosed over time. The presentation of the overall shape and volume of an object in tactile experience is itself spread over time like the activity that discloses it. One potential lesson, then, for the metaphysics of sensory presentation, is that the object of perception may be disclosed over time, that its presentation in perceptual experience may have duration.

Second, that the grasping hand assimilates to the overall shape and volume of the object grasped is potentially epistemically significant. The full case for this will have to wait (Section 1.5 and Chapter 6.1), but we can begin to get a sense of why this might be so. A rigid, solid body has a certain overall shape and volume prior to being grasped. Moreover, it is sufficiently rigid and solid to maintain that overall shape and volume even when grasped. In making an effort to more precisely mold the hand to the contours of the rigid, solid object, the hand thus takes on, to an approximate degree, the overall shape and volume of the object grasped. That is to say, the hand takes on a certain configuration determined by the hand's anatomy, the activity of the hand, and the overall shape of the object grasped. And with the hand so configured, the shape of its interior approximates the overall shape of the object grasped. Moreover, the hand, so configured, encompasses a region of a certain volume itself determined by the hand and the volume of the object grasped. And the volume of the region that the hand encompasses approximates the volume of the object grasped. That is the point of making an effort to more precisely mold the hand to contours of the rigid object. In engaging in such haptic activity, in molding one's hand more precisely to the contours of the object, one ensures that the overall shape and volume the object had prior to being grasped, and maintained in being grasped, explains, in part, the hand's configuration in grasping the object and the force that needs to be exerted to maintain that configuration. Suppose that it is our hand's configuration in grasping and the force that needs to be exerted in maintaining that configuration that discloses the overall shape and volume of the object. If so, at least in the present instance, haptic perception is dependent, in some appropriate sense, upon proprioception, kinesthesis, our capacity for motor activity, and our sense of agency (for relevant discussion, see Fulkerson 2014; Martin 1992; O'Shaughnessy 1989, 1995; we will discuss this dependency in Chapter 2). Since the object's overall shape and volume explains the hand's configuration and force, if the object eludes the hand's grasp, then that configuration and force would not have occurred. If the object is absent, there is nothing for the hand to assimilate to. Perhaps the objectivity of grasping, understood as a mode of haptic perception, consists in the grasping hand's assimilating to the tangible qualities the object had prior to grasping.

Against this suggestion, it might be objected that, at least for certain graspings, it is possible for the object to be absent and yet the hand to be in a duplicate configuration. However, a felt difference would remain. Maintaining the hand's configuration in the absence of the object requires